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STRATEGIC CONTROL: A FRAMEWORK FOR EFFECTIVE
RESPONSE TO ENVIRONMENTAL CHANGE*

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I. Introduction

An occasional criticisms of corporate strategic planning is that too formalized a plan may stifle the company's ability to react fast enough to unexpected environmental opportunities and/or threats. To a large extent we disagree with such a criticism because we feel that it rests on a major misconception that planning can significantly reduce the uncertainty in the firm's environment. Rather, all that planning can do is to help the corporation assess the riskiness of the various strategic options it faces, analyze potential consequences of unforeseen environmental events so that it can be better prepared to react and to choose, and pursue a set of strategies that represents an acceptable level of risk for the company when seen as one corporate portfolio. In order for planning to fulfill its proper role in a rapidly changing business environment, it is necessary that the company develop the capability to assess the impact of and react to unexpected environmental developments. We find that several companies which are doing a good job of planning are handling less well the monitoring of the plan in light of more recent developments in the environment. In this respect we shall concede that there might be some truth to the statement of criticism in the opening sentence of this article, but, this is more in the nature of a criticism of the planning function as currently developed in these companies, rather than a valid criticism of strategic planning itself. Accordingly, in the following we shall suggest an approach for strengthening a firm's capability to assess the impacts from environmental factors and to react to these.

II. How to Think About an Environmental Factor

There are, of course, an infinite number of events that might take place and that potentially might affect one's company. Nobody will be able to isolate all these factors ahead of time; the basic notion of uncertainty implies that events will cause a greater or lesser surprise to the company. Consequently, there is little we can add about outguessing the future. However, we shall suggest a way of thinking about key environmental factors that will put the task of scanning the environment into a better focus, in terms of connecting it to the process of allocating resources within the company.

We shall assume that the company is organized in such a way that it has allocated clear management responsibilities for the development and execution of specific strategies, such as a corporate level portfolio plan and strategy, several business unit plans and strategies (say, for each of its divisions), and strategies and plans for cross-functional programs (such as R & D, manufacturing and marketing working together on a long-term program for developing and launching a new product line). The first step then will be to ask the manager responsible for a particular strategic plan to list what he considers to be those environmental factors with the greatest potential impact on the outcome of his plan. Although it is admittedly a very difficult task to come up with an exhaustive list, a good manager should be able to pinpoint at least those areas that might affect his planned funds flow. Since this approach should never be viewed as anything more than a heuristic tool, any reasonable list of environmental factors is better than no list.

For each of the environmental factors isolated the manager should now ask two fundamental questions:

- To what extent am I able to predict the behavior and effect of this factor?
- To what extent am I able to react with a discretionary response to this potential factor's development so that adverse effects can be reduced or ameliorated, or, alternatively, so that favorable effects can be taken advantage of?

Depending on the answer to each of these two questions, we shall classify each particular environmental factor in terms of which of the following cells it will fall into in Exhibit 1:

		DEGREE OF PREDICTABILITY POTENTIAL	
		HIGH	LOW
DEGREE OF DISCRETIONARY RESPONSE POTENTIAL	MUCH		
	LITTLE		

Exhibit 1. Classification Scheme for an Environmental Factor¹

¹In his thesis Strasmore [6] has taken an approach similar to the above in developing a planning scheme. Simon's work [5] distinguishes between programmed/unprogrammed versus "traditional/modern" decisions. Perrow [3] distinguishes between solution processes that are analyzable/unanalyzable versus high/low variation in the problem encountered. These, as well as other works, are closely related to the above way of looking at an environmental factor.

As we shall see, the classification of environmental factors into this two-by-two matrix will prove useful, in that it will provide the basis for differentiated approaches to scanning, tracking, and feedback for each factor class, as well as allow for the use of different control modes. Further, we shall see that it is useful to consider the risk associated with a particular strategy as a function of the clustering pattern within these dimensions of analysis of the environmental factors associated with the strategy; this can then be utilized to modify the riskiness of a business unit's strategic plan as well as a corporate portfolio plan.

III. Scanning, Tracking and Feedback

In order to respond effectively to the development of an environmental factor we need to scan its movements, track our own performance in relation to it, and provide a mechanism of feedback to the relevant decision-maker(s) so that corrective actions can be taken as required. This calls for a four-step process.

The first step will be to examine one's already prepared plan (or budget) and ask what particular value a certain environmental factor has implicitly or explicitly been given in its preparation.² This will establish a desired result level for this factor, and possibly some upper or lower bound for indifference. (Incidentally, the manager may decide to revise his plan when examining the nature of its dependence on environmental factors, since he may

²It is outside the scope of this article to discuss how one might go about developing a plan and/or a budget. See Lorange and Vancil [1].

detect several environmental assumptions that are unrealistic upon further analysis.)

The second step is to explore the extent to which the development of the environmental factor in question can be forecast; to do this, we may follow one of two basic approaches.³ According to the so-called "lead-indicator" method, we need to define one or more predictors of the factor. For instance, a manufacturer of a particular type of synthetic fiber may have identified his demand level as a key environmental factor. Perhaps new car production levels are a good predictor of this factor; our fibers producer has found that fiber demand picks up or slackens with approximately a six month lag after swings in new car production. On the other hand, it may well be that we are unable to identify a reasonably reliable predictor, in which case the degree of predictability of the factor is low. We may at the other extreme be able to identify several reliable predictors and then must decide which predictors to rely on and the relative emphasis on each. In such a case we have high predictability of the factor. Alternatively, according to the so-called "extrapolation" method, we may attempt to identify a set of historical time-series data for the phenomenon, and to use this as the basis for predicting how the phenomenon might develop in the future. Provided that the historical data are of reasonable quality and that one feels reasonably confident that the data still provide a realistic picture of the nature of the environmental phenomenon, then a reliable prediction can be given.

³ A discussion of the information needs for each of the two prediction approaches can be found in Revsine [4]. Newman [2] has an interesting discussion of the role of predictors and the steps in the feedback process of management control.

A manager may have different degrees of confidence in various forecasts or indicators that he is using as proxies for predicting a variable at hand. Based on experience, he may therefore be willing to react more strongly to some than others. Thus, since the manager has more confidence in the prediction of some phenomena than others, we typically find most environmental factors classified between the high versus low predictability extremes. However, the dichotomized point of view is useful for presenting our argument in a more simplified manner.

Having determined the desired result for an environmental factor as well as the forecast(s) and/or (set of) relevant predictor(s), our third step is to allocate responsibility for scanning the predictor(s) and/or the environmental factor. It will also be necessary to specify the information flow and when a deviation is large enough to be reported, i.e. exceeding some upper or lower bounds.

The final step will be to analyze the potential effects of a revised forecast on one's plan (or budget) and, if necessary and/or feasible, to take corrective action.

The first step, to define desired result(s) for an environmental factor, as well as the third step, to scan and monitor the development of this factor, will always have to take place when attempting to undertake environmental factor analysis. The second step, identification of forecasts/predictors, will not always be feasible. Similarly, the fourth step, analysis and execution of corrective action, will not always be feasible; it depends on whether there exists a possibility for discretionary response, to be discussed in the next section.

IV. Control Modes

When the manager can ameliorate the negative effects from the development of an environmental factor or take advantage of a potentially positive development, then he has a high degree of discretionary response potential. Unfortunately, it is often the case that the manager has few or no alternatives to make significant corrective actions after a strategy has been decided on; he then has low discretionary response potential. We shall suggest four different approaches to control depending on whether there is high or low potential for discretionary response to carry out corrective action in case of an environmental phenomenon, and depending on whether the potential is high or low for the predictability of the environmental factor. The four modes of control to be discussed will coincide with what might be the most appropriate control approach for a phenomenon in each of the four cells of Exhibit 1.

a) High Predictability - High Discretionary Response: Steering Control⁴

This is a potentially ideal situation for effectively incorporating the effects of environmental factors. The manager will be able on a more or less continuous basis to monitor the forecast and/or predictor(s) for the environmental phenomenon and he has several alternatives at his disposal for taking corrective actions when necessary. One might compare this discretionary situation with a rocket which is being monitored continuously in its flight towards a target and where

⁴The concept of steering control has been developed by Newman [2].

small corrections of its course can be initiated when necessary. Adverse effects can be avoided by making corrective actions in time through steering control. Whenever possible, one should always attempt to institute steering control. This does, however, assume that one is able to carry out both the identification and selection of adequate predictors and identify key alternative discretionary response options.

b) Low Predictability - High Discretionary Response: Contingency Control

In this situation we shall be unable to develop reliable predictors for an environmental phenomenon and hence must be content with merely monitoring the environmental factor as an unpredictable phenomenon. However, the manager is in a position where he has considerable discretionary possibilities to change his strategic plan as soon as he is confronted with the adverse or positive development in the environmental phenomenon. What might be advantageous in such a situation is to develop contingency strategies of alternative actions to take in case an environmental phenomenon should occur. Such alternative plans are often called contingency plans; hence this label on this type of control. It should be noted that contingency plans have been hailed as a very desirable and useful approach for companies to follow during this age of rapid environmental changes. Used in the particular context discussed above, contingency control might indeed be useful. However, some firms also apply contingency control in situations where they could do better by making use of steering control or, equally inappropriately, they make use of it in situations where it is inapplicable because of lack of real discretionary response options (as opposed to wishful thinking about hypothetical response options).

c) High Predictability - Low Discretionary Response: Anticipative Continue-Withdraw Control

In this situation the task of identifying good predictors for an environmental phenomenon is feasible, but it is difficult to come up with realistic and viable options to change the strategy once it has been instituted. The control task in this case will be to make use of the predictability property to monitor the environmental factor and to stay alert to consequences of its development. The basic option for the manager is whether he should discontinue the strategy or not in light of the most recent forecast of the factor's development. Anticipative continue-withdraw control thus emphasizes staying alert and reacting in time to cut losses, or alternatively, speeding up again when favorable trends are evidenced.

d) Low Predictability - Low Discretionary Response: Post Facto Continue-Withdraw Control

When there is little potential for forecasting a phenomenon as well as little potential for meaningful discretionary responses to modify a plan after the start of its implementation, then we have little control. All we can do is assess the situation after the fact and decide whether to continue with the strategy or to close down. There is much less of an opportunity to "cut losses" in such a situation. Maybe the most important aspect of control in this case is the post-facto analysis of why something went right or wrong so that the manager can systematically learn from experience.

Let us in Exhibit 2 summarize the four types of control and show what each approach requires in terms of forecasting and discretionary response potentials.

		DEGREE OF PREDICTABILITY POTENTIAL	
		HIGH	LOW
DEGREE OF DISCRETIONARY RESPONSE POTENTIAL	MUCH	STEERING	CONTINGENCY
	LITTLE	ANTICIPATIVE CONTINUE - WITHDRAW	POST-FACTO CONTINUE - WITHDRAW

Exhibit 2. Summary of Properties of the Four Types of Control

We have by now developed a structure for using the most appropriate control approach to monitor the effects of an environmental phenomenon on an organizational unit's plan. Confusion here is likely to result in inappropriate use of control technique for the phenomenon at hand, which at the extreme might result in substantial unnecessary opportunity losses for the firm.

The classification of an environmental phenomenon into any of the four cells of Exhibit 1 is not only crucial in terms of its impact on the choice of control approach, but even more importantly it provides us with a tool for

assessing the riskiness of an organizational unit's strategy. For instance, a company which has classified the majority of the environmental factors that might affect its strategy as falling into the low predictability - low discretionary response cell, seems to be in a much more risky situation than a company which is exposed primarily to high predictability - high discretionary response factors. We shall discuss this issue of risk assessment of strategy, first for a business unit of a company (say, a division) and then for the portfolio strategy of the company as a whole.

V. Strategic Risk: Strategic Business Unit

A plan for a strategic business unit (say, a division) can normally be expressed in terms of three dimensions: the funds flow dimension, the competitive strength dimension (for instance, relative market share), and the business attractiveness dimension (such as the growth rate of overall demand in the relevant market).⁵ The funds flow dimension's level in the plan will be a result of planned change in the other two dimensions. Thus, a relevant environmental factor will have a direct impact on the division's competitive strength or the business attractiveness of its markets, and thereby indirectly influencing the planned funds flow.

The competitive strength dimension typically might be affected by moves of the firm's competitors, such as the introduction of a new product, change in price or entry into a new market. Often such moves are difficult to predict, in that they are results of discrete one-shot actions by competitors,

⁵See Lorange and Vancil [1].

and little or no relevant historical data is available. In several instances, however, one might be able to get "early warnings" of an upcoming competitive move. For instance, test marketing campaigns on the part of a competitor may indicate that a new product and/or market is about to be introduced or entered. When it comes to the firm's potential for discretionary response to moves from the competitors, however, there are usually several opportunities, such as retaliating by adjusting one's own price, increased advertising campaigns, or development and introduction of a new product on one's own. There is often a time-lag, however, before one's response move can become effective; for instance, the development of a new product might take years. We might conclude that environmental factors which have primary impact on the competitive strength of a business unit's strategy and plan often fall within the low predictability-high discretionary response area. Contingency control is thus often a meaningful tool here. This will embrace assessments of relevant response measures and the time lags associated with each, summarized as a cost/benefit analysis. To achieve quick response will largely be a function of the quality of the prior planning that has been done.

Environmental factors affecting the attractiveness of the business are often associated with the nature of demand for a product, i.e. its stage in the product life cycle. There seem to be a number of quite general properties associated with the product life-cycle phenomenon, such as the nature of innovations (product vs. process), the competitive mode (quality vs. price), number of competitors (many and in flux vs. few and stable), in addition to changes in the growth of demand itself.⁶ To some extent one should be able

⁶For a discussion of product life cycle's impact on business strategy and planning, see Wright [7].

to forecast the development of this phenomenon, since there seems to be some regularity in the historical patterns. The firm's potential for discretionary response, however, is often limited. To some extent it may be able to adjust to the changes implied by the movement into a new life-cycle for the product; there is, however, little it can do to revert the movement of the process itself. Thus, environmental factors affecting the business attractiveness underlying the plan of a business unit often fall into the area of relatively high predictability but low discretionary response. An anticipative continue-withdraw control approach might be appropriate for the handling of these factors.

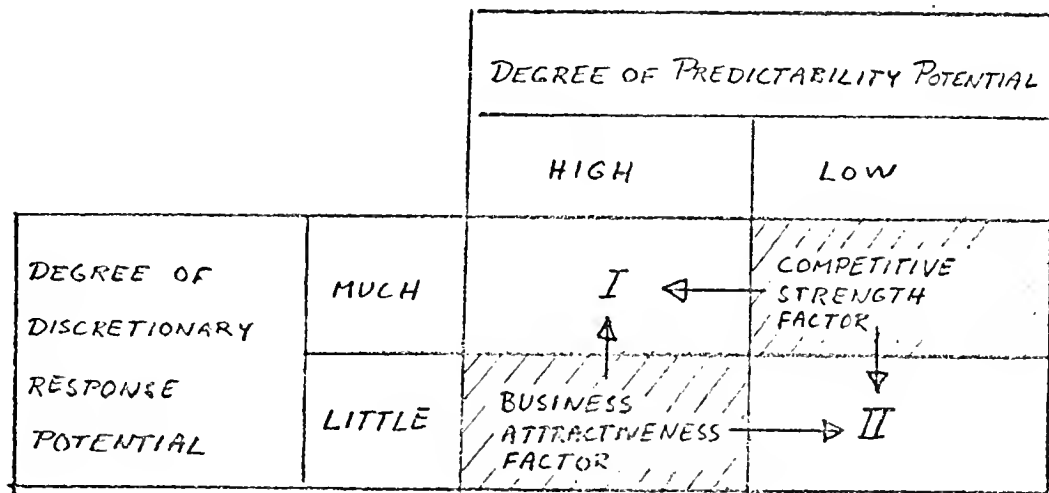


Exhibit 3. Typical Clustering of Environmental Factors for a Strategic Business Unit (for example, a Division)

A typical strategic business unit such as a division might then follow a strategy and a plan in which the environmental factors affecting it would fall largely into the two shaded cells of Exhibit 3. A major task in the development of improved plans for a business unit then will be to analyze alternative strategies and the strategic programs associated with their implementation, focusing on how key environmental factors associated with the strategy/strategic program alternatives might cluster. Particular emphasis should be put on "improving" a strategy/strategic program by improving the degree of predictability of one or more competitive strength factors and/or developing the means of discretionary response to one or more business attractiveness factors, as indicated by arrow I in Exhibit 3. Particular concern should arise if such "improvements" are not possible, or even more alarming, if it turns out that the clustering of key environmental factors is shifting in the other direction, as indicated by arrow II.

The role of post-facto learning will be an important source for improving the goodness of a strategy. This will be particularly important when predictability is low. Thus, post-facto control reviews should be instituted particularly in such instances. Although learning might improve a manager's ability to predict, and therefore might merit less effort being spent on this task, it is important that he will be required to search for "new aspects of the phenomenon", so that experience and routine does not diminish his alertness.

Carrying out an analysis of a business' key environmental factors in the way we have discussed might yield at least three important benefits. First, it allows for an assessment of the riskiness of a division's strategy as well as a comparison with other divisions' strategies. It is, of course, not

necessarily "bad" to have a risky division; what is bad, however, is the fact that a conscious assessment of risk is often neglected. Secondly, it allows for the assessment of changes in risk over time. Particularly important here is the "flagging" of an often hidden and slowly increasing implicit risk posture for a division. Thirdly, the approach might have a strong catalytic effect in terms of motivating development of alternative strategies and/or programs that are less risky.

VI. Strategic Risk: Corporate Portfolio Level

Let us now turn to a discussion of environmental factors as they might affect the portfolio strategy of the organization.

The overall corporate portfolio strategy attempts to tie together a number of divisional business strategies in such a way that the various "business legs" of the firm complement each other, in terms of funds flow and risk characteristics. Thus, the development of a corporate portfolio strategy and plan goes well beyond facilitating the development of and the "adding up" of a set of good and reasonable divisional plans. The pattern of funds flow from the businesses will have to fit together; in order to increase this fit it may be desirable to change the balance of the business portfolio by emphasizing growth within a selected number of businesses and/or through acquisitions/divestitures. The development of a portfolio plan for the corporation does of course assume an exchange of relevant planning information between the corporate level and the divisions. We shall discuss implications of this later.

A corporate portfolio plan will be built up around funds flow movements. The sources of funds to be assumed in the portfolio plan might come from three areas: from the operations of some of the businesses, typically those that enjoy fairly high market share and are in a more mature stage; from the divestitures of some of the businesses; or from external financing. The portfolio plan pattern for uses of funds might fall into two areas: for the internal development of new products and/or markets within some of the existing businesses, typically ones that enjoy promising growth prospects and where the competitive strength is reasonably good; or for the acquisition of new businesses. We shall discuss the nature of potential impacts from environmental factors on each of the three classes of funds sources and two classes of funds uses in the portfolio plan, in terms of predictability and discretionary response potential considerations.

The planned patterns of funds to be generated from divisions might, of course, not be fulfilled. The factors influencing this have already been discussed in Section V. It should be added that the corporate level will require to know when a division's planned funds flow pattern is not likely to be fulfilled, since this might have repercussions on the overall planned portfolio pattern of funds use. The corporate level will be in a better position to come up with good discretionary responses the earlier it is aware of the situation. A typical corporate discretionary response will be to modify the timing of certain funds outflows, for example, by delaying an investment decision. A tailor-made control system for monitoring each business' environmental factors and a feedback procedure to the corporate level that highlights critical deviations are, of course, crucial in order to avoid surprises.

Incidentally, it should be noted that the pattern of centralization/ decentralization in a company might be analyzed in terms of the risks associated with each of the firm's businesses and information-handling implications of the control methods thereby needed. For instance, businesses that appropriately can be controlled by means of steering control will be associated with relatively low implicit risk positions. However, the amount of information required to carry out steering control will be typically large. Thus, a company will have to rely on decentralized management of such businesses; it would be an unnecessary strain on top management's time to manage them in a highly centralized mode.

Conversely, a business that appropriately can be controlled in a post-facto continue-withdraw mode is typically a very risky one. However, the volume of information associated with this type of control is typically much less. Thus, a centralized approach is the more appropriate for managing such businesses. (Imagine what might happen when such businesses are managed in a decentralized manner, as if steering control might be applied. This was the case with the ocean tanker divisions of some oil companies. The results were disastrous for some of these companies, bringing at least one to the verge of bankruptcy.)

The plan for divestiture might typically face problems of predictability in that it might be highly uncertain whether a buyer can be found who will be willing to agree on reasonable terms. However, the predictability might be improved if the corporation attempts to seek out buyers in whose portfolios the business would fit. The discretionary response would be reasonably high, since the seller can modify its terms or withdraw. A company's freedom to

make discretionary moves when selling a business is being curtailed, however, to the extent that selling a division may be virtually impossible. Antitrust regulations may prevent the sale of a business to the very companies where the business constitutes a fit with their portfolio; sales to foreign companies are often difficult; and the social constraints on "wheeling and dealing" with divisions are increasing.

In terms of external financing timing is often critical in order to achieve what has been planned. Forecasting of interest rates, currency changes and general credit availability becomes crucial in this respect. Although considerable progress has been made in this area it is usually still difficult to come up with a reliable forecast. The company's discretionary response options will, of course, depend on its general liquidity situation. In case of relatively tight liquidity it may be forced to enter external financing agreements even though the timing is not favorable.

Turning now to the corporate portfolio plan's uses of funds let us first discuss the issue of transfer of funds to certain divisions with high growth potential. Conceptually, it makes sense for corporate management to emphasize these and curtail the marginal businesses. It is probably not a large problem to forecast which businesses are more attractive, and which seem to be more marginal. However, when it comes to discretionary response potential, the company may run into serious curtailment of its options to move. First, in many companies there will be a strong resentment among the non-growth divisions against being "milked" of their excess funds. This might be particularly so if the company as a whole has been enjoying strong general growth, thus feeling less pressure to look closely at marginal elements of

its portfolio. Another reason may be that the divisions are so strong in themselves that the corporate level is more one of a holding company, without enough "muscle" to execute portfolio redistribution. Such a situation for example, frequently exists if the company was formed through the recent merger of a few relatively large companies, each of which manages to continue its autonomous mode of operation. A third reason might be that the top management lacks the power, philosophy, or willingness to take such an active role in reshaping the company's portfolio.

A second set of reasons why the discretionary flexibility to carry out portfolio adjustments might be low rests with increasing government and/or trade union intervention when it comes to labor force adjustments, including alternative employment offerings. In several countries it has become very difficult or at least very costly, to scale down the labor force, thus impairing the curtailment of a business. Even the offering of alternative jobs within the same company (and same geographic region) might become difficult. Thus, there are growing signs that increased labor power and labor immobility might curtail major portfolio moves.

Finally, when it comes to the use of funds through acquisitions we might apply the same line of argument that we used for divestitures: namely, that environmental factors make this process quite unpredictable but that the discretionary response potential typically is high.

Let us now summarize our discussion of the nature of environmental factors' potential effects on a corporation's portfolio strategy. In Exhibit 4 we have indicated the pattern in which cells the various classes of environmental factors affecting the portfolio strategy typically might fall.

Here too it is important that the portfolio strategy is being managed and monitored over time, so that the risk implied can be contained. Movements along arrows I are of course desirable; movements along arrows II are potential danger signals.

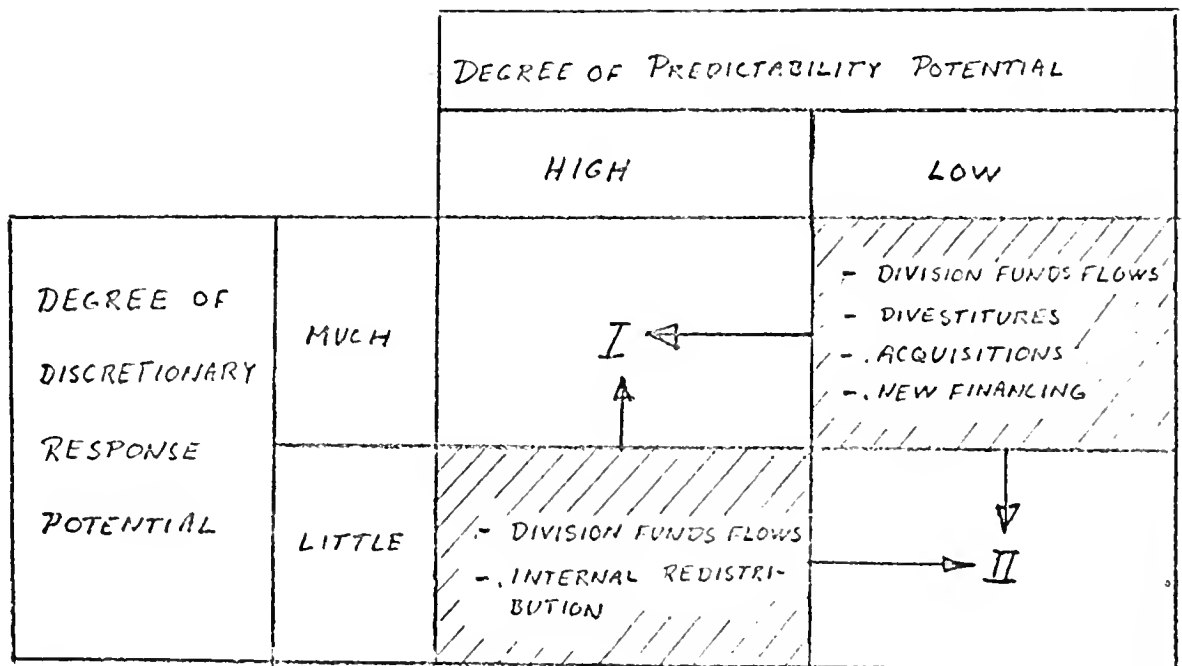


Exhibit 4. Typical Clustering of Environmental Factors for a Corporate Portfolio

The scattering of environmental factors associated with a company's portfolio strategy will give a picture of the general environmental risk exposure of the company. Particularly important in this respect is the internal redistribution factor. The multinational corporations, in particular, should be alert to deterioration of flexibility here, and might want to expand to areas of the world that offer a better outlook for such flexibility.

VII. Conclusions

We have proposed that environmental factors should be classified in terms of the degree of predictability with which we might be able to monitor them and the degree of discretionary response potential the company has in reacting to the factors. This classification has several implications. First, environmental scanning should be carried out with the nature of the phenomenon in mind. Second, different control modes seem more useful to monitor and respond to the various types of factors. Third, the risk associated with a strategy can be assessed by analyzing the types of environmental forces to which the plan is exposed. Finally, this type of analysis might lead to the improvement of plans so that unnecessary risk exposure can be avoided. Thus, by incorporating this heuristic framework for strategic control of environmental factors, strategic planning should become more responsive and flexible and thereby provide the organization with a valuable tool for coping with its complex and unstable environments.



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